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PATENT

Docket No.: 50090-449



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Takashi TERAUCHI, et al.

Serial No.: 09/976,341

Filed: October 15, 2001

Group Art Unit: 2815

Examiner: B. Baumeister

For: METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE, AND
SEMICONDUCTOR DEVICE HAVING MEMORY CELL

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REQUEST FOR RECONSIDERATION

Commissioner for Patents
Washington, DC 20231

Sir:

Reconsideration of the rejection of claims 6 through 14 under 35 U.S.C. §103 imposed in the Office Action dated July 31, 2002 is solicited in light of the following Remarks.

REMARKS

Clarification of the Record

It is requested that the Examiner clarify the record by acknowledging Applicants' claim for priority under 35 U.S.C. §119 and receipt of the certified copy of the priority document submitted on October 15, 2002.

It is further requested that the Examiner clarify the record by acknowledging receipt of the Information Disclosure Statement (IDS) filed on October 15, 2001 and

provide an appropriately initialed copy of Form PTO-1449 indicating consideration of the cited prior art.

Claims 6 through 14 (although claims 8 and 9 were indicated to be allowable if presented in independent form) were rejected 35 U.S.C. §103 for obviousness predicated upon Jang in view of Cunningham

In the statement of the rejection, the Examiner asserted that Jang discloses certain limitations of the claimed invention and then asserted that Cunningham discloses other limitations of the claimed invention. There followed an obviousness conclusion. This rejection is traversed.

Independent claim 6 is directed to a method comprising a sequence of manipulative steps which includes thermally oxidizing the second silicon film, which manipulative step results in the formation of the gate bird's beaks. This manipulative step is neither disclosed nor suggested by the applied prior art. Specifically, Jang does not even disclose all of the polysilicon spacers 460 are oxidized for forming gate bird's beaks on gate edges. Further, Jang discloses that a polysilicon oxide 440 is formed between gate 435 and spacers 460. Ergo, even if the spacers 460 are oxidized, gate bird's beaks can not be formed.

Cunningham does not disclose the formation of a thermal oxide film and, hence, does not cure the argued deficiencies of Jang.

Based upon the foregoing, it should be apparent that, as a factual matter, even if the applied references are combined, the claimed invention would **not** result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988). Further,

for reasons which should be apparent from the following, the requisite realistic motivation has not been established.

There is No Motivation

Applicants further submit that the Examiner failed to establish the requisite realistic motivation for combining the applied references. As held by the Court of Appeals for the Federal Circuit, in imposing a rejection under 35 U.S.C. §103, the Examiner must make a "thorough and searching" factual inquiry and, based upon that factually inquiry, explain **why** one having ordinary skill in the art would have realistically impelled to modify prior art, in this case Jang's methodology, to arrive at the claimed invention. *In re Lee*, 237 F.3d 1338, 61 USPQ 1440, 1443 (Fed. Cir. 2002). Merely identifying wherein features of a claimed invention are perceived to be reside in disparate references is not legally sufficient to establish the requisite realistic motivation. *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *Grain Processing Corp. v. American-Maize Products Co.*, 840 F.2d 902, 5 USPQ2d 1788 (Fed. Cir. 1988). In the present case, the Examiner has done little more than identify wherein features of the claimed invention are perceive to reside in disparate references. This approach falls short of the requisite "thorough and searching" factual inquiry mandated by the Court of Appeals of the Federal Circuit. *In re supra*. Ergo, the requisite motivational element is lacking.

The Examiner merely asserted that one having ordinary skill in the art would have been motivated to combine the applied references because the silicide reduces the recessitivity of the gate structure. Thus, the motivation asserted by the Examiner relates

to forming a silicide layer on the polysilicon layer. However, in accordance with the present invention, the width of a gate interconnection becomes narrow by thermally oxidizing to form the gate bird's beaks. This results in an **increase** in the resistance of the gate inteconnection. The applied references do not address this problem. It should, therefore, be apparent that the Examiner's in support of the motivation element is **not** applicable to the present claims.

Evidence of nonobviousness

It is well settled that the problem addressed in solved by a claimed invention is entitled to consideration as an indicium of nonobviousness. *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 28 USPQ2d 1333 (Fed. Cir. 1993); *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989); *In re Nomiya*, 509 F.2d 566, 184 USPQ 607 (CCPA 1975). The present invention addresses and solves no less than three problems attendant upon conventional practices, as disclosed in the written description of the specification commencing at page 2, line 29. Specifically, the present invention addresses problems which include increased resistance of the gate interconnection (page 3 of the written description, lines 5 through 7), bulging of the oxidized silicide film leading to embedding failures (page 3 of the written description, first and second full paragraphs) and stress induced on the gate oxide thereby reducing device reliability (paragraph bridging pages 3 and 4 of the written description of the specification). These problems are not even on the radar screens of the applied

references. Ergo, the problems addressed and solved by the claimed invention merit consideration as a potent indicium of nonobviousness.

Further, Applicants would separately argue the patentability of original claims 8, 13 and 14 which specify the conditions of the deposition of the second silicon film (claim 8) and the oxidation conditions (claims 13 and 14). The Examiner asserted that such limitations involve "only routine skill in the art" (third enumerated paragraph on page 3 of the July 13, 2002 Office Action). Applicants submit the Examiner committed clear legal error, because the Examiner failed to point out wherein the temperature of deposition of the second silicon film or the oxidation temperature is identified as an **art recognized result effective variable**. Absent any such art recognition, it is legally erroneous for the Examiner to conclude that one having ordinary skill in art would have been led to optimize any such parameter. *In re Rijckaert*, *a F.3d 1531*, *28 USPQ2d 1955* (Fed. Cir. 1993); *In re Yates*, *663 F.2d 1054*, *211 USPQ 1149* (CCPA 1981); *In re Antonie*, *559 F.2d 618*, *195 USPQ 6* (CCPA 1977).

Conclusion

Based upon the foregoing, Applicants submit the a *prima facie* basis to deny patentability to the claimed invention has not been established. Moreover, upon giving due consideration to the problems addressed and solved by the claimed invention, which go unnoticed in the applied references, the conclusion appears inescapable that one having ordinary skill in the art would **not** have found the claimed invention **as a whole**

obvious within the meaning of 35 U.S.C. §103. *Jones v. Hardy*, 727 F.2d 1524, 220 USPQ 1021 (Fed. Cir. 1984).


Applicants, therefore, submit that the imposed rejection of claims 6 through 14 (presumably intending claims 6, 7 and 10 through 14 according to the "Office Action Summary") under 35 U.S.C. §103 for obviousness predicated upon Jang in view of Cunningham is not factually or legally viable and, hence, solicit withdrawal thereof.

Applicants acknowledge, with appreciation, the Examiner's allowance of claims 1 through 5 and indication that claims 8 and 9 contain allowable subject matter. Based upon the foregoing, it should be apparent the imposed rejection has been overcome and that all active claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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